2014 FRA
Rail Program Delivery

Railroad Planning Basics

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Railroad Planning Basics

Where we have trouble is not down in the weeds. .

But basics, fundamentals. . .

Background understandings

FRA

Funds passenger and freight, not commuter rail

Changes must be freight and commuter NEUTRAL

Amtrak

Intercity Interregional Interstate International

Amtrak can. . .

- Operate over any rail carrier in U.S.
- Operate must comply with FRA safety regulations
- Add passenger trains
- Take property by eminent domain, incl freight RR

Amtrak cannot. . .

- "impair unreasonably" other services

Elements to Plan a Corridor

1. Basic track configuration/geometry
2. Signal Systems
3. Train Types and Performance
4. Passenger Stations, ADA Platform
5. **Dispatching / Controlling the Railroad**

Basic Track Configuration/Geometry

1. Spirals – First used in the US about 1900
   - Superelevation
   - Unbalance
   - Jerk Rates
2. Turnout sizes and use
3. Track geometry – FRA classifications
4. Undercutting/ballast cleaning
5. Junctions – configuration and pocket tracks
6. Yard leads – length

Note!
FRA requires
track configuration plans
signed by all parties at 30% design level

Basic Track Configuration/Geometry

KEY DECISIONS that affect OPERATIONS

- one track or two?
- one passenger platform or two?

Signal Systems

Types of signals – Speed / Route

Considerations

- Braking distances – freight / passenger
- Turnout Speeds

Positive Train Control (PTC) Enforcement

(Note: Fabrication and installation time typically 18-24 months)

Train Types & Performance

Freight

- **Locals / transfer runs**
- **Unit trains**
- **Manifest trains**
- **Intermodal trains**

Passenger

- **Intercity**
- **Commuter zone express**
- **Commuter locals**

Rolling Stock

- Locomotives w individual cars
- Push - Pull train
- Diesel Multiple Unit (DMU)

Planning Considerations for Stations

- Location on railroad?
- Location in community?
- Platform for each track?
- Terminal or run-through?
- Access
  - Transit
  - Bike
  - Kiss-n-ride
  - Car Parking

Retro-Engagement-Union-Station-Los-Angeles-Luminaire-Images-couple-train, www.brides.com

Controlling and Dispatching the RR

MORAL OF THE STORY:

If you're fighting track conditions and slow-downs. . . it makes no sense to obsess about the Maximum Authorized Speed. Just strive to minimize trip time. Understand your constraints on speed due to:

Number of tracks

Spacing of sidings

Spacing of cross-overs

Number of platforms

Planning implications of ADA

Americans with Disabilities Act 49 CFR Parts 37 and 38

Macro-scale Goal for the Country

- 48” high platforms on the NEC
- 15” high elsewhere

To achieve INTEROPERABLITY, non-interference with Freight

Subset:

- Is freight traffic present?
- Who owns the track (private or public)?

kidsafe-train019 httpwww.medialaunch.com.au1114

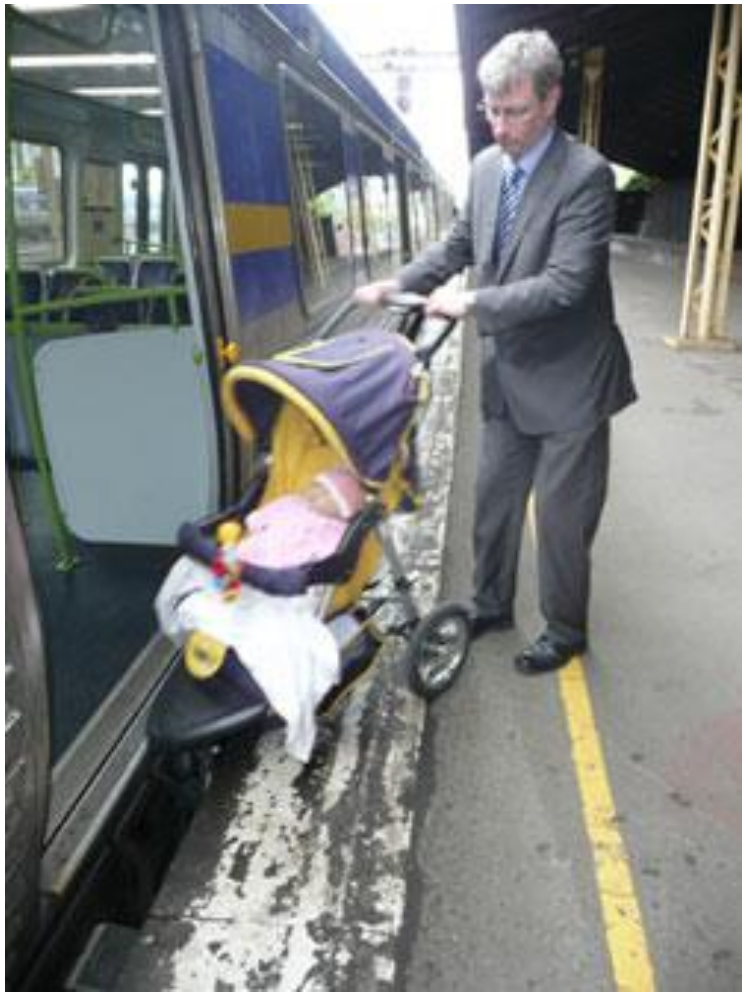
Planning implications of ADA

Station tracks

- Platform tracks?
- Curves and grade crossings?
- Interlockings?

Micro-scale of the person accessing the train

- Path of travel – 2 ½ inch flangeway gaps?
- 6-foot clearance to platform obstructions



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Planning for Yard Facilities

1. **Location**
2. **Train and Equipment Storage**
3. **Light Maintenance**
4. **Crew Base**

Big questions loom in the Passenger world. . .

- Where are these facilities?
- Who operates and maintains?
- Who shares the cost?

Planning for Train Servicing

1. **Daily (Cleaning, Food Restocking, Toilet Servicing)**
2. **Inspections (Remove and Replace Bad Order Cars and Locomotives)**
3. **Fueling**

We have to plan for this . . .

It is especially difficult if equipment has to turn during the day, may have to service the train… **The biggest question is Where? The planning issue is mostly location.**

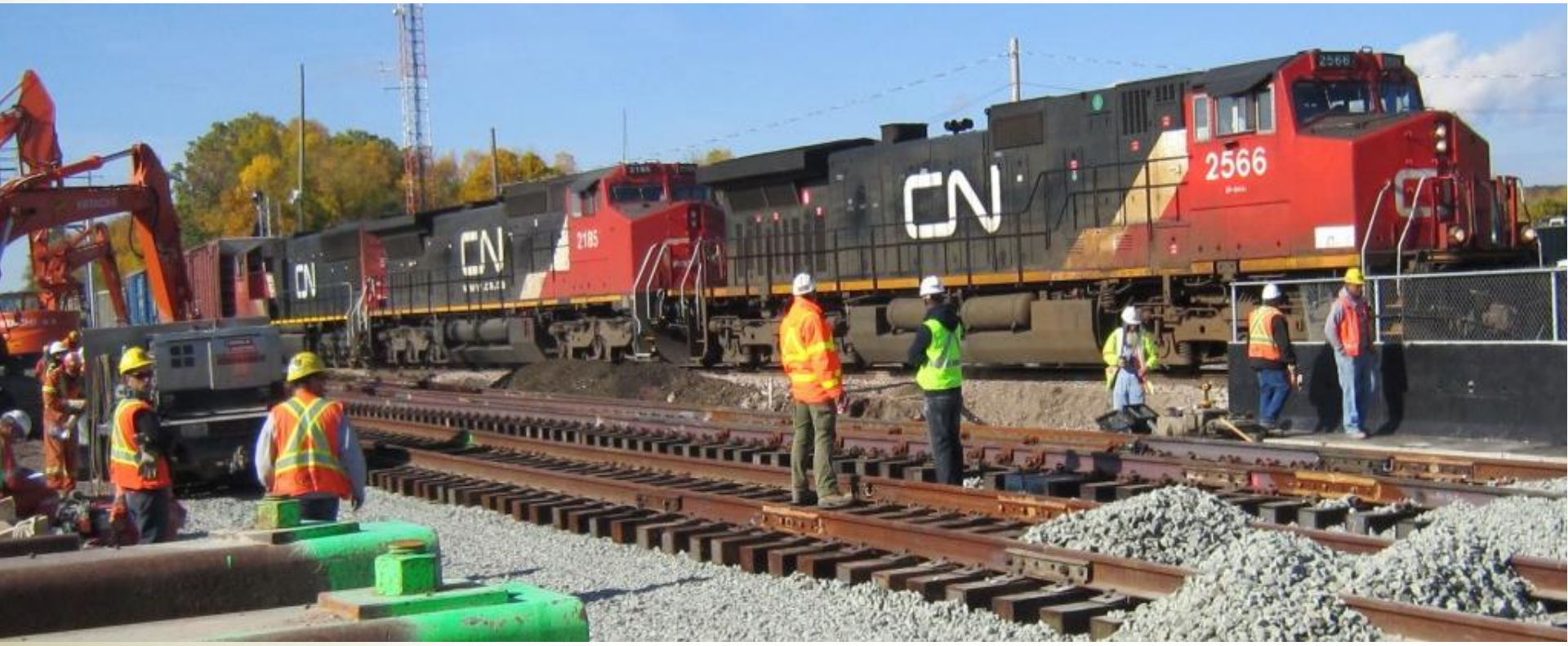
Overnight is easy by comparison.

Planning for Construction

(implications for ongoing operations)

CONSIDER: Interface w RR operations, Staging Sequence,

RR forces vs contractors, Detours and temp services



Of all of these . . .

- Track Configuration
- Signal Systems
- Train Types
- Controlling and Dispatching
- Stations
- Yards
- Train Servicing
- Construction

The Least Understood Aspect!

Dispatching & Controlling the Railroad

The **TIME REQUIRED** to make train moves. CRITICAL!!

- **Time not distance**
  - Train priorities
  - Signaled route lock-up time
  - Multiple / different control centers – communications time
  - Crew change locations
  - Train location indicators – distance resolution of train locations
- **Use train modeling to optimize capacity**

Bringing it all together in a Full Corridor Analysis

- **Test different schedules…** various schedules.. Runs…Test other departure times..
- **Play with combinations** to identify /eliminate crunch points….
- **RTC is full blown simulation**
  - Of trains on a RR. Results in minutes delay for each type of train. Pin point bottlenecks.
  - RTC Model – operations simulation – used by freights; all the trains running intermingled
- **TPC – Train Performance Calculator – for train movement**
  - HP per ton, air resistance, curve restrictions, grades, stations, signal aspects
  - Once track geometry is in there.. play away.. diff train lengths
  - Run train wo impediments; add 7-8% time for good measure

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